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## Next generation geometry model for Tracking in ACTS

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ACTS is an experiment independent toolkit for track reconstruction, which is designed from the ground up for thread-safety and high performance. It is built to accommodate different experiment deployment scenarios, and also serves as community platform for research and development of new approaches and algorithms.

A fundamental component of ACTS is the geometry library. It models a simplified representation of a detector, compared to simulation geometries. It drives the numerical track extrapolation, provides crucial inputs to track finding and fitting algorithms, and is connected to many other geometry libraries in the ecosystem, shipping with multiple plugins.

ACTS' geometry library is historically optimized for symmetric, collider-like detectors and most suitable for arrangements of silicon sensors. An effort has been underway for some amount of time to rewrite large parts of the geometry code.

The goal is to be more flexible to accommodate other detector approaches and simplify the building process, while providing easy conversion to a GPU-optimized geometry for use with the detrax library. Another goal is to allow for a more systematic way to write geometry plugins.

Finally, the navigation logic is delegated to detector regions, so that it can be easily extended for unconventional environments.

This contribution reports on the result of this rewrite, discusses lessons learned from the project and how they were incorporated into a robust geometry modeling solution in ACTS that will be key going forward.

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